

1. Demographic Information

Background

During the spring 2023 semester the Ohio Articulation and Transfer Network (OATN) held a discussion with the Renewable Energy Transfer Assurance Guide (TAG) panel to review current learning outcomes. With the Renewable Energy TAG area learning outcomes last reviewed in 2017, subject matter experts serving on the TAG panel participated in an in-depth review to determine if learning outcomes revisions are recommended.

After some discussion, the TAG faculty panel has recommended revisions to the following Renewable Energy TAG courses:

- ORE001: Introduction to Alternative and Renewable Energy
- ORE002: Solar Thermal
- ORE003: Solar Photovoltaic
- ORE004: Safety
- ORE005: Wind Energy

ORE001: Introduction to Alternative and Renewable Energy

- Adjustment to title from “Introduction to Alternative and Renewable Energy” to “Introduction to Renewable Energy”.
- Revisions to course learning outcomes.

ORE002: Solar Thermal

- Revisions to course learning outcomes.

ORE003: Solar Photovoltaic

- Revisions to course learning outcomes.

ORE004: Safety

- Due to OSHA guidelines no course learning outcomes revisions required.

ORE005: Wind Energy

- Revisions to course learning outcomes.

What We Need From You:

The Renewable Energy TAG panel seeks feedback from your institutions regarding the proposed revisions. Please arrange to have the appropriate Renewable Energy faculty at your institution assist with commenting and completing the survey as soon as possible but no later than April 24, 2023. We are collecting only one representative response per institution. Please work within your institution to reach institutional consensus prior to providing feedback. A copy of the proposed TAG course learning outcomes has been attached as reference.

Please provide your institutional response by **April 24, 2023**. The survey link is:
<https://www.surveymonkey.com/r/Z6JMW2H>

Thank you in advance for your assistance. If you have any questions, contact Jessi Spencer, Senior Director, OATN Policy, Budget, and Constituent Relations, as 614-728-4706 or jspencer@highered.ohio.gov.

*** 1. Demographic Information about the Person Completing this Survey**

Name

Institution

Department

Title

Email

Phone

*** 2. Please Indicate the Type of Institution that you represent**

☐ Two-Year Institution

☐ Four-Year Institution

2. Introduction to Alternative and Renewable Energy (ORE001)

3 Semester Hours

1. To better align to the field a title shift has been recommended for ORE001. Originally titled as "Introduction to Alternative and Renewable Energy" to now "Introduction to Renewable Energy".

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

2. **Student Learning Outcome #1:** "Introductory knowledge of renewable and alternative energy sources (essential)." Proposed revisions "Identify, compare and contrast various energy sources including fossil fuels, nuclear energy, alternative energy, and renewable energy (essential)."

- ☐ Agree with proposed change
- ☐ Disagree with proposed change

3. **Student Learning Outcome #2:** "Knowledge of energy and energy systems for commercial and/or residential use (essential)." Proposed revisions "Demonstrate a comprehensive knowledge of energy and energy systems for utility, commercial, and/or residential use (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

4. **Student Learning Outcome #3:** "Introductory knowledge about the types, components, construction and basic installation of the various advanced and renewable energy sources (essential)." Proposed revisions "Demonstrate an introductory knowledge about the system configuration options, components, construction and basic installation and design of the various renewable energy generation systems. (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

5. **Student Learning Outcome #4:** "Knowledge of the roles, responsibilities, regulations, and economics pertaining to advanced and renewable energy (essential)." Proposed revisions "Understand the roles, responsibilities, regulations, and economics pertaining to renewable energy systems (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

6. Student Learning Outcome #5: "Knowledge of disciplines and career areas associated with advanced and renewable energy (essential)." Proposed revisions "Identify the disciplines and career areas associated with advanced and renewable energy (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

7. Comments:

3. Solar Thermal (ORE002)

3 Semester Hours

1. Student Learning Outcome #1: *(NEW)* "Understand the differences and similarities between solar thermal and solar electric (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

2. Student Learning Outcome #2: *(NEW)* "Understand concentrating and non-concentrating solar thermal (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

3. Student Learning Outcome #3: "Site analysis, including load analysis (essential)."
Proposed revisions "Perform site analysis, including load analysis (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

4. Student Learning Outcome #4: "Solar heating safety practices, standards, codes and certifications (essential)." Proposed revisions "Demonstrate knowledge of solar heating safety practices, standards, codes and certifications (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

5. Student Learning Outcome #5: "Systems for specific climates and applications (essential)."
Proposed revisions "Evaluate systems for specific climates and applications (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

6. Student Learning Outcome #6: "Operation and installation methods (essential)." Proposed revisions "Demonstrate knowledge of operation and installation methods (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

7. Student Learning Outcome #7: "Proper use of balance-of-system components and materials (e.g. controllers, tanks, pumps and valves) (essential)." Proposed revisions "Describe proper use of balance-of-system components and materials (e.g. controllers, tanks, pumps and valves) (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

8. Student Learning Outcome #8: "Solar Heating Maintenance (essential)." Proposed revisions "Demonstrate knowledge of Solar Heating Maintenance (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

9. Student Learning Outcome #9 (New): "Identify disciplines and career areas associated with solar energy (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

10. Previous Student Learning Outcome #7 (Removal): "Geothermal Energy Production (non-essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

11. Previous Student Learning Outcome #8 (Removal): "Heat Pumps (non-essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

12. Additional Comments:

4. Solar Photovoltaic (ORE003)

3 Semester Hours

1. Student Learning Outcome #1: "PV markets and applications (essential)." Proposed revisions "Identify PV markets and applications (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

2. Student Learning Outcome #2: "PV specific safety basics (essential)." Proposed revisions "Internalize PV specific safety basics (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

3. Student Learning Outcome #3: "PV electricity basics (essential)." Proposed revisions "Demonstrate basic electric knowledge (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

4. Student Learning Outcome #4: "Solar energy PV module fundamentals (essential)." Proposed revisions "Understand solar energy PV cell and module fundamentals (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

5. Student Learning Outcome #5 (New): "Explain the various solar PV system configurations (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

6. Student Learning Outcome #6 (New): "Perform a site assessment (essential)."

- ☐ Agree with proposed change
- ☐ Disagree with proposed change

7. Student Learning Outcome #7: "System components and PV system sizing principles (essential)." Proposed revisions "Identify and select system components (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

8. Student Learning Outcome #8: "PV system electrical design and mechanical design (essential)." Proposed revisions "Complete a PV system design (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

9. Student Learning Outcome #9: "Performance analysis, maintenance and troubleshooting (essential)." Proposed revisions "Understand what is necessary for PV system maintenance and troubleshooting (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

10. Student Learning Outcome #10 (New): "Demonstrate knowledge of disciplines and career areas associated with solar energy (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

11. Additional Comments:

5. Safety (ORE004)

1 Semester Hour

Due to OSHA guidelines no course learning outcomes revisions are required.

6. Wind Energy (ORE005)

3 Semester Hours

1. Student Learning Outcome #1: "Determine the potential wind available from a given area and calculate the electrical energy that could be achieved (essential)." Proposed revisions "Determine the potential wind available from a given site and calculate the electrical energy that could be achieved (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

Student Learning Outcome #2 (Unchanged): "Summarize the sizes and variations of different wind turbines including residential and commercial systems (essential)."

2. Student Learning Outcome #3: "Recognize the main components and construction of a wind turbine (essential)." Proposed revisions "Identify and select the main components and construction of a wind turbine. (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

3. Student Learning Outcome #4 (New): "Demonstrate basic electric knowledge (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

Previous Student Learning Outcome #4 now Student Learning Outcome #5 (Unchanged): "Discuss the basic considerations, regulations, and criteria for constructing a wind turbine in a given area (essential)."

Previous Student Learning Outcome #5 now Student Learning Outcome #6 (Unchanged): "Evaluate relevant conditions and determine size of and energy potential of a wind turbine in a given area (essential)."

4. Previous Student Learning Outcome #6 (Removal): "Evaluate various monitoring devices related to turbine construction and use (essential)."

- ☐ Agree with proposed change
- ☐ Disagree with proposed change

5. Student Learning Outcome #7 (New): "Determine wind turbine system design and installation for a specific site (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

6. Student Learning Outcome #8 (New): "Demonstrate knowledge of disciplines and career areas associated with wind energy (essential)."

- ☐ Agree with proposed changes
- ☐ Disagree with proposed changes

7. Additional Comments:

7. Survey Completion

Thank you for completing this survey!